REMARKS

Applicants thank the Examiner for total consideration given the present application. Claims 1-18 are currently pending of which claims 1 and 5 are independent. Claims 1, 5, 16, and 17 have been amended through this Reply. Upon careful review, one would conclude that this amendment does not raise any new issue nor does it add any new matter to the application. Support for this amendment can be found at least in paragraph [0170] of the instant specification. Applicants respectfully request reconsideration of the rejected claims in light of the amendment and remarks presented herein, and earnestly seek timely allowance of all pending claims.

35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

Claims 1-18 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

Although Applicants do not necessarily agree with the Examiner's assertion of indefiniteness, Applicants have amended claims 1 and 5 to include, *inter alia*, "the binder ***is selected*** so that linear thermal expansion coefficient of a material for the fins is between linear thermal expansion coefficient of the adsorbent and linear thermal expansion coefficient of the binder" in order to expedite prosecution."

Accordingly, Applicants respectfully request that the Section 112, second paragraph rejection of claims 1-18 be withdrawn.

35 U.S.C. § 103 REJECTION – Maier-Laxhuber, Takahashi

The Examiner rejects claims 1-18 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Maier-Laxhuber in view of Takahashi et al. (U.S. Patent No. 6,346,298)[hereinafter "Takahashi"]. Applicants respectfully traverse these rejections.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Additionally, there must be a reason why one of ordinary skill in the art would modify the reference or combine reference teachings to obtain the

invention. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* The Supreme Court of the United States has recently held that the "teaching, suggestion, motivation test" is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* ***Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.*** *Id.*

First, it is respectfully submitted that neither Maier-Laxhuber nor Takahashi, alone or in combination teach or suggest, *inter alia*, "***the adsorbent layer is constituted of a dry solid layer of a water-based emulsion binder mixed with the adsorbent, and a mass ratio between a solid portion of the water-based emulsion binder and the adsorbent is not lower than 1:3 and not higher than 1:8***" as recited in amended claim 1.

As previously submitted, Maier-Laxhuber teaches a zeolite layer 4 formed on a surface of a lamella 3 of a heat exchanger. Whereas, Takahashi teaches three resin layers 2a-2c formed on a base foil. However, both of the cited references fail to teach the mass ratio between an absorbent in an absorbent layer and a water-based emulsion binder. Therefore, the claimed invention of the present application is patentable over the cited references.

Second, it is respectfully submitted that neither Maier-Laxhuber nor Takahashi, alone or in combination teach or suggest, *inter alia*, "***the binder is selected so that linear thermal expansion coefficient of a material for the fins is between linear thermal expansion coefficient of the adsorbent and linear thermal expansion coefficient of the binder***" as recited in amended claims 1 and 5. Indeed, the Examiner did not even address the above-noted limitation.

Instead, the Examiner first states, "Maier-Laxhuber et al. does not state that the binder has a thermal expansion coefficient greater than that of the fins. However, Maier-Laxhuber et al states at col. 2, lines 11-14 that the materials used are intended to solve the prior art problem of

the adsorbent bed coating delaminating from the fins due to differences in expansion coefficients." The Examiner further states, "Since in Maier-Laxhuber et al. the thermal expansion coefficients of the fins and the adsorbent bed are apparently approximately the same, the binder would necessarily have a higher thermal expansion coefficient." (*See Office Action, page 4, first full paragraph.*)

First of all, even if, *assuming arguendo*, Maier-Laxhuber uses materials that are intended to solve the prior art problem of the adsorbent bed coating delaminating from the fins due to differences in expansion coefficients, nowhere does Maier-Laxhuber provides any teaching or suggestion that the ***binder is selected so that linear thermal expansion coefficient of a material for the fins (lamellas 3) is between linear thermal expansion coefficient of the adsorbent (zeolite) and linear thermal expansion coefficient of the binder***.

Second, nowhere does Maier-Laxhuber teach or suggest that the thermal expansion coefficients of the lamellas 3 (fins) and zeolite layer 4 (adsorbent bed) are apparently approximately the same as alleged by the Examiner. Thus, the Examiner's allegation that the binder would necessarily have a higher thermal expansion coefficient is without merit. If this rejection is maintained, clarification from the Examiner is respectfully requested.

In addition, even if, *assuming arguendo*, there is sufficient motivation to combine Maier-Laxhuber and Takahashi (which Applicants respectfully disagree), the combined invention would not render claims 1 and 5 obvious for the following reasons.

Linear thermal expansion coefficient of the fins largely differs from linear thermal expansion coefficient of the adsorbent (zeolite). Therefore, when the heat exchanger is heated or cooled, thermal strain of the fins completely differs from thermal strain of the adsorbent. As a result, the adsorbent layer falls off the fins.

In the claimed invention, the binder is selected such that linear thermal expansion coefficient of a material for the fins ***is between linear thermal expansion coefficient of the adsorbent and linear thermal expansion coefficient of the binder*** in order to prevent the adsorbent layer from falling off.

By contrast, Takahashi teaches that linear thermal expansion coefficient of an entire resin layer 2 ***is larger*** than linear thermal expansion coefficient of a metal foil 1, and the linear thermal expansion coefficient of a resin layer 2 is determined to render the metal foil 1 convex. Thus, it is respectfully submitted Takahashi cannot teach or suggest, *inter alia*, "***the binder is selected so that linear thermal expansion coefficient of a material for the fins is between linear thermal expansion coefficient of the adsorbent and linear thermal expansion coefficient of the binder***" as recited in amended claims 1 and 5.

Therefore, for at least the above reasons, it is respectfully submitted that claims 1 and 5 are distinguishable from Maier-Laxhuber and Takahashi. Claims 2-4 and 6-18 are distinguishable from Maier-Laxhuber and Takahashi at least by virtue of their dependence on corresponding independent claim and further in view of novel features recited therein.

Accordingly, it is respectfully requested to withdraw the rejection of claims 1-18, based on Maier-Laxhuber and Takahashi.

Further, in regard to claims 2-4 and 6-18, it is respectfully submitted that when a cited reference, used as a basis to reject one or more claims, is complex or shows or describes inventions other than that claimed, the particular part of the cited reference relied upon must be designated nearly as practicable. *See 37 C.F.R. § 1.104(c)(2).* **The Office Action fails to meet this burden**.

In this instance, claims 2-4 and 6-18 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Maier-Laxhuber in view of Takahashi et al. (U.S. Patent No. 6,346,298)[hereinafter "Takahashi"]. Indeed, except for claims 3, 4, and 12, ***it is merely concluded that it would have been obvious to one of ordinary skill in the art*** to use any desired thickness and thermal conductivity of the adsorbent layer, fin pitch, and air velocity in the heat exchanger of Maier-Laxhuber, ***based on intended use of the device***.

A mere statement of "based on intended use of the device" is not sufficient to meet the burden of establishing prima facie obviousness.

Also, where a major technical rejection is proper, the rejection should be stated with a full development of reasons rather than by a mere conclusion coupled with some stereotyped

expression. *See M.P.E.P. 707.07(g).* As noted above, it is merely concluded that it would have been obvious to one of ordinary skill in the art to use any desired thickness and thermal conductivity of the adsorbent layer, fin pitch, and air velocity in the heat exchanger of Maier-Laxhuber, based on intended use of the device. The burden of stating the rejection with a full development of reasons has not been met.

It is respectfully submitted that none of the applied prior art references, either alone or in combination teaches or suggest that "the adsorbent layer satisfies $t/\lambda \leq 10$ wherein t is a thickness (mm) of the adsorbent layer and λ is a thermal conductivity (W/mK) of the adsorbent layer in the thickness direction (claim 6)"; "wherein a fin pitch is not less than 1.2 mm and not more than 3.5 mm (claim 7)"; "wherein air velocity is not less than 0.5 m/s and not more than 1.5 m/s (claim 8)"; "wherein the thickness t (mm) of the adsorbent layer is not less than 0.05 mm and not more than 0.5 mm (claim 9)"; "wherein the thermal conductivity λ (W/mK) of the adsorbent layer is not less than 0.05 W/mK and not more than 1.00 W/mK (claim 10)"; "wherein the heat exchanger is a fin-and-tube heat exchanger (claim 11)"; "wherein the adsorbent layer has a multilayered structure in which the adsorbent content ratio varies in the thickness direction (claim 13)"; "wherein the adsorbent content ratio in the adsorbent layer decreases toward the fin (claim 14)"; "wherein the adsorbent is zeolite, silica gel or a mixture thereof and the binder is a urethane resin, an acrylic resin or an ethylene-vinyl acetate copolymer (claim 15)"; "wherein the water-based emulsion binder is an organic water-based emulsion binder (amended claim 16)"; "wherein the adsorbent is zeolite, silica gel or a mixture thereof, the water-based emulsion binder is a urethane resin, an acrylic resin or an ethylene-vinyl acetate copolymer (amended claim 17)"; and "wherein the thickness t (mm) of the adsorbent layer is not less than 0.05 mm and not more than 0.5 mm (claim 18)".

Applicants respectfully request the Examiner to withdraw the obviousness rejection of claims 6-11 and 13-18 based on "intended use" arguments and provide specific references in support of the rejection.

Further, in regard to claim 12, the Examiner acknowledges that Maier-Laxhuber fails to teach the mass ratio between the adsorbent and the binder being varied in the different layers in

the thickness direction. The Examiner, however, alleges that Takahashi teaches "varying the composition of different layers to match a thermal expansion coefficient of a base layer in a first layer and to have gradually decreasing thermal expansion coefficients in subsequent layers." **It is noted that the Examiner provides to direction as to where in Takahashi the above-noted limitation can be found**.

As mentioned earlier, when a cited reference, used as a basis to reject one or more claims, is complex or shows or describes inventions other than that claimed, the particular part of the cited reference relied upon must be designated nearly as practicable. Upon careful review of the Takahashi reference, it is respectfully submitted that Takahashi fails to teach or suggest the above-noted feature of claim 12. If the rejection is maintained, Applicant requests that the particular parts of the cited references be designated and full development of reasons be provided.

CONCLUSION

All rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claims does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Ali M. Imam Reg. No. 58,755 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

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